4.1 DYESTUFF CHEMISTRY

L	T	P
3	-	3

RATIONALE

It is essential for a diploma holder in textile processing to have knowledge regarding chemistry of synthetic dyes, classification of dyes and synthesis of selected dyestuffs. Hence this subject.

DETAILED CONTENTS

1.	Introduction to the chemistry of synthetic dyes.	(3 hrs)
2.	Classification of dyes from chemical point of view.	(4 hrs)
3.	Coal tar distillation and products related to synthesis of dyes.	(4 hrs)
4.	Intermediate processes – sulphonation, nitration, halogenations and amination.	(10 hrs)
5.	Colour and chemical constitutions (Witts Theory)	(4 hrs)
6.	Various forces responsible for dyestuff applications.	(2 hrs)
7.	Diazotisation and coupling.	(3 hrs)
8.	Acid – Bon acid, chicago acid, knoch acid, H-acid, tobias acid, K-acid, M-acid, gamma acid.	(6 hrs)
9.	Synthesis of selected dyestuffs – Naphthol yellow S, acid orange 11, metanil yellow, orange R, Methyl orange, Methyl red, Congo red, Bismark brown, Chloramine B.	(6 hrs)
10.	Testing of various dyes in powder/paste form and on dyed yarn/ fabric.	(6 hrs)

LIST OF PRACTICALS

1. Testing of direct dyes in powder/paste form and on dyed yarn/fabric/blends.
2. Testing of basic/modified basic dyes in powder/paste form and on dyed yarn/fabric/blends.
3. Testing of vat dyes in powder/paste form and on dyes yarn/fabric/blends.
4. Testing of soluble vat dyes in powder/paste form and on dyed yarn/fabric/blends.
5. Testing of acid dyes in powder/paste form and on dyed yarn/fabric/blends.
6. Testing of metal complex dyes in powder/paste form and on dyed yarn/fabric/blends.
7. Testing of pigment colours in powder/paste form and on dyed yarn/fabric/blends.
8. Testing of disperse dyes in powder/paste form and on dyed yarn/fabric/blends.
9. Testing of reactive dyes in powder/paste form and on dyed yarn/fabric/blends.
10. Testing of sulpher dyes in powder/paste form and on dyed yarn/fabric/blends.

RECOMMENDED BOOKS

1. Dyes and their Intermediates by Abrahart.
2. Dyes and their Intermediates by Chatwal.
3. Introduction to the Chemistry of Dyestuffs by V.A. Shenai, Sevak Publishers, Mumbai.
4. Dyeing and Chemical Technology of Fibrous material by E.R Trotman; B.I. Publishers, New Delhi.
5. Dyes and Dyeing by Charles E. Pellow; Abhishek Publishers, Chandigarh.
6. Dye and their intermediates by Abrahart.
7. Fundamental Processes of Dye Chemistry by Fierz-David.

4.2 TECHNOLOGY OF BLEACHING-II

L	T	P
3	-	3

RATIONALE

To effectively supervise the processing of textile in bleaching section, a diploma holder in textile processing must know about principles of bleaching, operations, materials, equipment and processes. Hence this subject. The emphasis, should be made on development of skills in bleaching through practice.

DETAILED CONTENTS

1. Impurities in wool (2 hrs)

2. Carbonising processes for raw wool and woolen fabrics. (2 hrs)

3. Scouring of wool in loose form, yarn scouring & piece scouring (10hrs)
Methods of scouring-Emulsion & solvent scouring. Machines for scouring raw wool and fabric-description & mechanism.

4. Bleaching of wool with hydrogen peroxide, sodium hydro sulphite and sulfur dioxide (6 hrs)

5. Faults in woolen and worsted goods-listedness, vertical creases, weathering or drifting (2 hrs)

6. Silk- Degumming of raw silk, degumming of raw silk in blends with wool or acetate rayon. (6 hrs)

7. Bleaching of natural silk with hydrogen peroxide, sodium hydro sulphite. (6 hrs)
Bleaching to tussah silk (wild silk)

8. Bleaching of secondary cellulose acetate. (2 hrs)

9. Scouring and bleaching of man-made fibres-polyester, polyamide, acrylic.(6 hrs)

10. Scouring & bleaching of P/V, polyester/cotton blends (2 hrs)

11. Fluorescent Brighteners- methods of application, uses (2 hrs)

12. Preparatory processes for bast fibres-flax, jute, coir, hemp, sisal, ramie (2 hrs)

PRACTICALS

1. To carbonise the given wool sample.
2. To degum the given raw silk.
3. To bleach the given sample of silk with hydrogen peroxide.
4. To bleach the given sample of silk with sodium hydro sulphite.
5. To scour the given wool sample (loose form, yarn & fabric).
6. To bleach the given scoured wool sample with hydrogen peroxide.
7. To bleach the given scoured wool sample with sodium hydro sulphite.
8. To scour and bleach given sample of nylon.
9. To scour & bleach given sample of acrylic.
10. To scour & bleach given sample of polyester.
11. To scour & bleach given sample of P/C blend.

REFERENCE BOOKS:

1. Technology of bleaching by V.A Shenai; Sevak Publication Bombay.
2. Scouring, Bleaching & Mercerisation by E.R Trotmon, BI Publication, New Delhi.
3. Art of dyeing by B.S. Chauhan.
4. Dyeing & Chemical Technology of Textile Fibre by E.R. Trotman, B.I. Publication, New Delhi.
5. A Glimpse on the chemical technology of textile fibres by R.R. Chakravorty; Caxton Press, New Delhi.
6. Bleaching of linen, cotton yarn and fabrics by Tailfer; Abhishek Publication, Chandigarh.

4.3 TECHNOLOGY OF DYEING - II

L	T	P
3	-	4

RATIONALE

A diploma holder in textile processing must have sufficient knowledge and skills about principles of dyeing, operations, materials, equipment and processes. He should be able to execute various recipes for dyeing. Hence this subject.

DETAILED CONTENT

1. Suphur dyes- Properties, method of application to cotton, defects and remedies, application of soluble sulphur dyes. (6 hrs)
2. Vat dyestuffs – Properties, classification and application to cotton. (6 hrs)
3. Solublized vat dyes Principles, Properties and application to cotton. (6 hrs)
4. Azoic colours – Principles of dyeing and application to cotton. (6 hrs)
5. Mineral colour – Principles of dyeing and application to cotton. (6 hrs)
6. Reactive dyes – Principles, Properties and application to cotton. (6 hrs)
7. Disperse dyes – Properties, preparation of polyamide and polyester fabrics, application of disperse dyes to polyamide and polyester. (6 hrs)
8. Pthalogen Blue – Concept of pigment dyeing, Alcian blue dyes– Principle, properties and applications on cotton. (4 hrs)
9. Pigments – Principles, properties and its applications. (2 hrs)

LIST OF PRACTICALS

1. Dyeing of cotton with sulpher dyes (three dyes) and after treatments.
2. Dyeing of cotton with vat dyes (three dyes)
3. Dyeing of cotton with soluble vat dyes (three dyes)
4. Dyeing of cotton with azoic colours (three dyes)
5. Dyeing of cotton with reactive dyes (hot brand and cold brand)
6. Dyeing of polyamide and polyster.
7. Dyeing with disperse dyes (three dyes)

RECOMMENDED BOOKS

1. Technology of Dyeing by V.A Shenai; Sevak Publishers, Mumbai.
2. Dyeing and Chemical Technology of Textile Fibres by E.R Trotman; B.I. Publication, New Delhi.
3. A textbook of Dyes by Arora.
4. Printing and Dyeing of Fabrics by James.

4.4 TECHNOLOGY OF PRINTING-II

L T P
3 - 4

RATIONALE

A diploma holder in Textile processing must have through knowledge about principles & Practices employed for printing. He must be aware of various operations, materials, equipment and processes used for printing. Hence this subject.

DETAILED CONTENTS

1. Direct printing styles on cotton:- 16 hrs)
   Study of Printing by direct style with Direct, Reactive, Vat, Indigosol, Pigments colours, Aniline Black & Pthalo cynine (CPC), Alcian Blue Dyes & Napthol Colours. Description of Rapidozen and Rapid fast colour and their Printing alone & along with Illuminating colours (Vat, Indigosol, Aniline Black).

2. Discharge Printing style on cotton (8 hrs)
   Principles of Discharging, Various methods for white and coloured discharge printing on direct, Reactive, Vat (Reduction & oxidation Discharge) Napthol & Indigosol dyed grounds.

3. Resist Style of Printing on Cotton (10 hrs)
   Principles of Resisting, study of various methods for white and coloured Resist Printing under Napthol, Reactive vat, solublised vat, Aniline Black colours, as ground colours. Concept of Khadi Printing, white & coloured Khadi Printings.

4. Special Styles of Printing (8 hrs)
   Study of following special styles of printing with reference to process, materials & equipment used.

   - Dyed style – Tie and Dye or Bandhani Print
   - Batik style of Printing
   - Crimp style or crepon style of printing
   - Burn out style
   - Poly chromatic printing:-
     - Flow form Technique
     - Dye wave Technique

5. Transfer Printing (6 hrs)
Introduction to transfer printing - principle, process, mechanism of dye transfer, conditions required. Flat, continuos and vacuum transfer printing machine$_s$ Brief study of transfer paper printing methods.
Advantages & Disadvantage of Transfer Printing

PRACTICALS

1. To print a cotton fabric sample by direct style using reactive dyes (Cold Brand)

2. To print a cotton fabric sample by hot brand reactive dyes by direct style.

3. To print a cotton fabric sample by pigment colours.

4. To print a cotton fabric sample by Naphthal colour by base printing method.

5. To print a cotton fabric sample by Naphthal-Nitrite padding method.

6. To print a cotton fabric sample by resist style of printing (white resist) under Naphthal grounds by Block/Screen

7. To print a cotton fabric sample by resist style of printing (coloured resist) under Naphthal grounds by Block/Screen

8. To print a cotton fabric sample with abstract pattern by poly chromatic style of Printing.

9. To print a cotton fabric sample by crimp style of printing

10. To print a cotton fabric sample by Tie and Dye styles.

11. To print a cotton fabric sample by batik style

REFERENCE BOOKS

1. Technology of Printing by Dr.V.A. Shanai; Sewak Publication, Mumbai

2. Textile Printing by I.W.C. Miles

3. Textile Printing by Joyci Storey; Thames & Hudson, London

4. The creative guide to fabric screen Printing by Pam and Stall ebras New Holland Publishers Ltd., London

5. Principles of cotton Printing by D.G. Kale

6. The Principles and Practicle of Textile Printing by Knecht, E and Fothergill; J.B. London

7. A guide to printing Techniques by Bast; Japan

4.5 TEXTILE PHYSICAL TESTING

L	T	P
4	-	4

RATIONALE

A diploma holder in Textile Processing is responsible for controlling the quality of the final finished product; for which he is supposed to know about physical testing of textiles. For this purpose, knowledge and skills about physical testing need to be imparted to him. Hence this subject.

DETAILED CONTENT

1.	Introduction to textile testing- Aim & scope.	(2 hrs)
2.	Sampling techniques. General requirement.	(2 hrs)
3.	Sampling techniques for yarn and fabrics for specific tests.	(4 hrs)
4.	Relative humidity & methods of its determination.	(4 hrs)
5.	Importance of moisture content in textile materials and its determination. Standard moisture regains of different textile materials.	(6 hrs)
6.	Different yarn counts systems, their conversion and count calculations. Determination of count of yarn in different systems with the help of wrap reel, Beesley's balance, Quadrant balance, Knowle's yarn balance, yarn & cloth quadrant.	(6 hrs)
7.	Measurement of twist in spun, continuous filaments & ply yarns.	(6hrs)
8.	Methods of tests for fabric dimensions & other physical properties, viz thickness, weight, crimp.	(2 hrs)
9.	Shrinkage test.	(2 hrs)
10.	Air permeability & its measurement.	(2 hrs)
11.	Wettability, waterproof ness, water resistance and their measurement.	(2 hrs)
12.	Flame resistance & its measurement.	(2 hrs)
13.	Fabric strength testing: tensile, tearing and bursting strength tests. Principle & operation of equipment.	(8 hrs)

14. Fabric handle, stiffness & draping properties – Terminology and experimental methods. (8 hrs)

15. Serviceability, wear and abrasion – methods for measuring abrasion resistance and interpretation of results. (6 hrs)

16. Fabric creasing and crease recovery testing. (2 hrs)

LIST OF PRACTICALS

1. Twist in yarn: To find out the number of folds/twist per inch of single and ply yarn using twist tester.
2. To find out the yarn count with Beesley's balance, Quadrant balance, Knowle's yarn balance.
3. To find out Wt/sqm (GSM) of fabric using quadrant balance.
4. To find out moisture content and moisture regain of the given textile material by conditioning oven.
5. To find out the relative humidity by dry & wet bulb thermometer.
6. Determination of bursting strength of fabrics by using bursting strength tester.
7. To find breaking strength and elongation of fabrics on fabric breaking strength testing machine.
8. To find flammability of fabric using flammability tester.
9. To find crease recovery angle using crease – recovery tester.
10. To find physical dimensions of fabric viz length, width & thickness of the fabric.
11. To find crimp of the yarn by crimp testing machine.

RECOMMENDED BOOKS

1. Textile Testing by J.E. Booth; CBS Publication, New Delhi.
2. Textile Testing by Angappan Jayaparkashan, Publication.
3. Textile Testing by Grover and Hamby; Abhishek Publishers, Chandigarh.

INDUSTRIAL TRAINING

The student shall be exposed to a structured and supervised industrial training in the processing industry during summer vacation for 4 weeks.

The industrial training may be arranged in following.

1. Textile industry involved in wet processing of fibre/yarn and fabrics.
2. Textile industries involved in printing of textiles and furnished fabrics like carpets.
3. Export houses related to textiles.
4. Laundry department in hotel industry.
5. Industries involved in manufacturing of dyestuffs/textile auxiliaries.

TASKS TO BE ATTENDED

1. Preparation of layout of the factory.
2. Manpower employed.
3. Type of manpower in the factory.
4. Organization structure.
5. Type of processing machinery installed.
6. Details of processing machinery installed (giving complete sketch of machinery observed by the students).
7. Type of work done.
8. Details of textile processes employed.
9. Details of raw material used.
10. Details of financial resources.

Note:

The industrial training shall be planned and supervised by the teacher. The teacher may prepare well thought out exercises/questions well in advance after visiting the concerned industry in consultation with the officer/manager of the factory imparting industrial training.

Every student will be required to prepare a report of the industrial training under the supervision of teacher concerned and shall submit two copies to the institutions for evaluation and record.